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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/724,201

12/01/2003

Chi-Wen Liu

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8748

2292

7590

03/07/2006

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER

PHAM, THANHHA S

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 03/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/724,201

Applicant(s)

LIU ET AL.

Examiner

Thanhha Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 November 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
4a) Of the above claim(s) 1-14 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 15-21 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 01 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to Applicant's Amendment dated 11/23/2005.

Election/Restrictions

1. This application contains claims 1-14 drawn to an invention nonelected with traverse in the reply to elections/restriction dated 06/13/2005. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 15-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

► With respect to claim 15,

lines 5-6, the limitation “depositing a layer of material with a planar surface substantially the same as the conductive layer over the conductive layer” renders the claim indefinite. It is not clear which characteristics of the layer of material is considered as substantially the same as the conductive layer – the material of

the layer of material OR the planar surface of the layer of material? It is not clear that:

- "a layer of material with a planar surface substantially the same as the conductive layer" means that "a layer of material having a planar surface wherein the planar surface of the layer of material being substantially the same as a planar surface of the conductive layer" ; OR
- "a layer of material with a planar surface substantially the same as the conductive layer" means that "a layer of material having a planar surface wherein material of the layer of material being substantially the same as a material of the conductive layer".

For the purpose of examination, Examiner considers that the step of "depositing a layer of material with a planar surface substantially the same as the conductive layer over the conductive layer" means that "depositing a layer of material with a planar surface over the conductive layer, wherein material of the layer of material being substantially the same as a material of the conductive layer".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

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only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 15-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsu et al [US 2004/0067640] previously applied.

► With respect to claim 15, Hsu et al (figs 1's-2, text [0001]-[0033]) discloses the claimed CMP rework method comprising steps of:

providing a semiconductor substrate which has a patterned dielectric layer (16A/18B/16B, fig. 1C, text [0023]-[0027]), a barrier layer (24A) over the patterned dielectric layer, and a conductive layer (28A) over the barrier layer;

performing a first CMP process to remove part of the conductive layer (figs. 1C-1D, text [0028]);

depositing a layer of material (28B, fig 1E, text [0030]) with a planar surface over the conductive layer (see figure 1E below), wherein material of the layer of material (28B) being substantially the same as a material of the conductive layer (28A); and

performing a second CMP process to expose the patterned dielectric layer (fig 1E-1F, text [0031]).

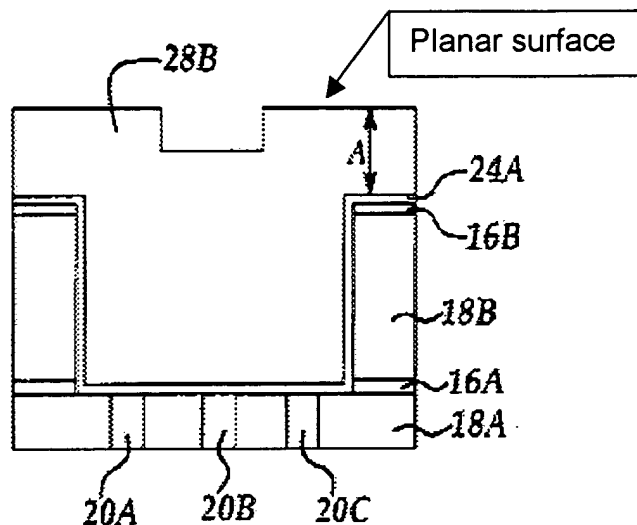


Figure 1E

- ▶ With respect to claim 16, Hsu et al (text [0023]-[0027]) discloses the conductive layer comprises copper or copper alloy.
- ▶ With respect to claim 17, Hsu et al (text [0023]-[0027]) discloses the dielectric layer (16A/18B/16B) comprises silicon dioxide, silicon nitride, phosphosilicate glass, borophosphosilicate glass, or fluorosilicate glass.
- ▶ With respect to claim 18, Hsu et al (text [0023]-[0027]) discloses the barrier layer (24A) comprises Ta, Ti, TaN, TiN, or WN.
- ▶ With respect to claim 19, Hsu et al (text [0023]-[0027]) discloses the deposition of copper or copper alloy is performed using electroplating, CVD, or PVD.
- ▶ With respect to claim 20, Hsu et al (fig 1E) discloses the top surface of the layer (28B) deposited in the step of depositing a layer of material substantially the same as the conductive layer over the conductive layer higher than the barrier layer (24A).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al [US 2004/0067640] in view of Gotkis et al [US 2004/0058620].

Hsu et al substantially discloses the claimed method except teaching the semiconductor substrate is reported as an abnormally polished wafer by a CMP machine at a predetermined CMP endpoint after performing said first CMP process to remove said part of said conductive layer.

However, Gotkis et al (fig 4, text [0001]-[0095]) discloses using the CMP machine for checking and reporting the semiconductor substrate if the semiconductor substrate is the abnormally polished wafer at the predetermined CMP endpoint after performing a CMP process to remove the part of the conductive layer and subjecting the abnormally polished wafer to rework process.

Therefore, at the time of invention, it would have been obvious for those skilled in the art to modify the process of Hsu et al by using the CMP machine for reporting the semiconductor wafer as being claimed, per taught by Gotkis et al, to provide a better controlled and convenient CMP rework process with increased efficiency such as time

saving of handling processed wafer (see Gotkis et al, text [0023] and [0042] specifically).

Response to Arguments

3. Applicant's arguments filed 11/23/20005 have been fully considered but they are not persuasive.

Applicant argues that the second copper layer 28B of Hsu is not planar. The argument is not persuasive because Hsu clearly discloses the second copper layer 28B having a planar surface (see fig. 1E above). Furthermore, Applicant does not claim that the entire upper surface of the layer of material is planar. Therefore, Hsu still meets and anticipates the claimed language of Applicant's invention.

Conclusion

4. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to be 'Thanhha Pham', with a large loop and a horizontal line extending to the right.

Thanhha Pham
Patent Examiner
Patent Examining Group 2800